Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Davis Creek

Waterbody Segment at a Glance:

County:	Lafayette
Nearby Cities:	Odessa
Length of Impairment:	2 miles
Pollutant 1:	Biochemical Oxygen Demand
Source 1:	Odessa Southeast Lagoon System
Pollutant 2:	Nutrients
Source 2:	Odessa Southeast Lagoon System
TMDL Priority Ranking:	High


State map showing location of watershed

Description of the Problem

Beneficial uses of Davis Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life and Human Health associated with Fish Consumption.

Use that is impaired

- Protection of Warm Water Aquatic Life.

Standards that apply

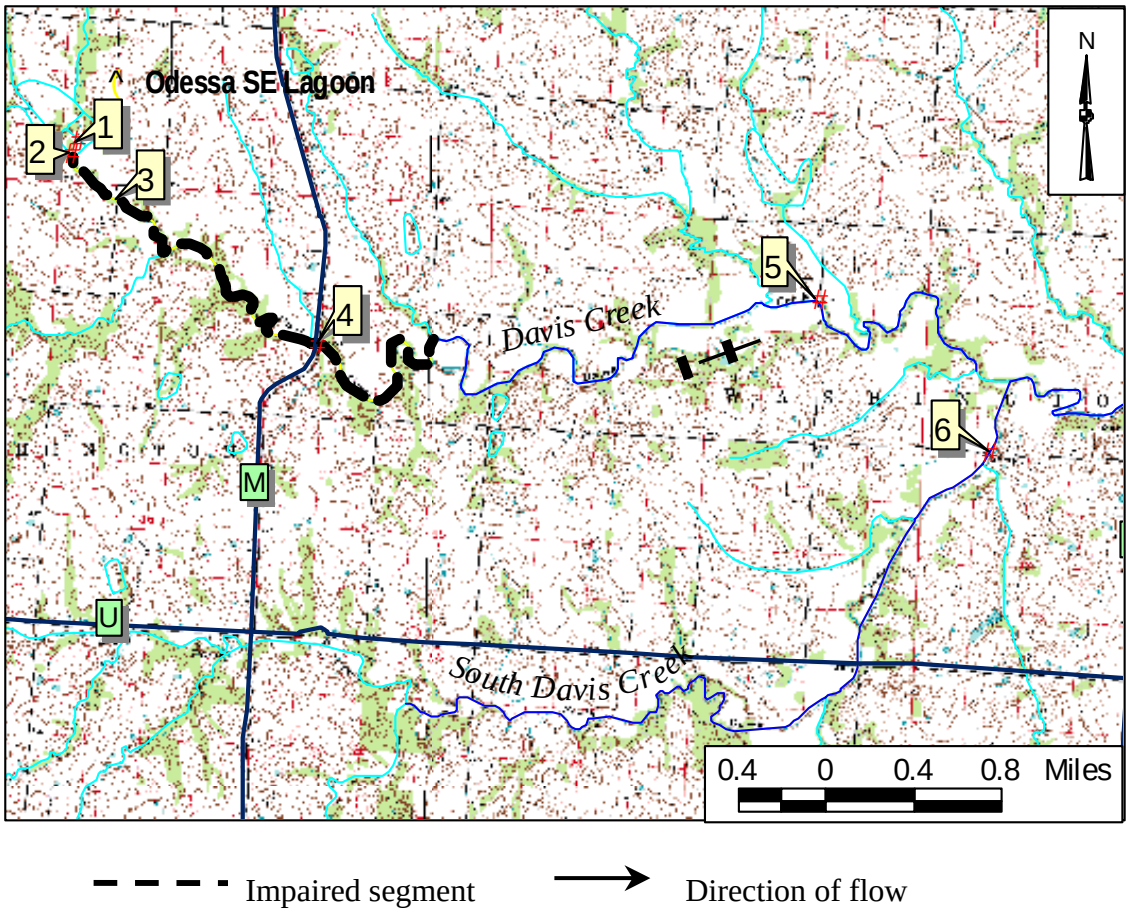
- The Missouri Water Quality Standard (WQS) for dissolved oxygen in streams is 5.0 milligrams per liter (mg/L) or parts per million. It is cited in 10 CSR 20-7.031 Table A.
- The specific criteria for ammonia are found in 10 CSR 20-7.031 Table B of the WQS. These limits are pH and water temperature dependent. The instream ammonia limits (at a pH of 7.8) are 2.0 mg/L for summer and 3.3 mg/L during the winter.

The effluent, or discharged water, from the Odessa Lagoon dominates Davis Creek when water levels are low. Low flow conditions usually occur during late summer and early fall, when rain is less frequent. The type of aquatic organisms that can thrive in an effluent-dominated stream usually changes. Most pollution-sensitive species of fish and invertebrates disappear and mainly pollution-tolerant organisms remain.

The following observations were reported in a July 1998 Missouri Department of Natural Resources Stream Survey Sampling Report: Davis Creek directly downstream of the Odessa Southeast Lagoon System had “a dark green color as a result of the effluent received from the lagoon system and high aesthetic impact due to algal growth and septic conditions along the streambed.” Excessive algal growth and septic conditions result in less oxygen being available in the water. Most aquatic organisms require high levels of oxygen to survive. The water in Davis Creek does not always meet the 5.0 mg/L standard. In addition, ammonia is a common by-product of wastewater treatment and under certain conditions can be toxic to aquatic life.

The Davis Creek TMDL was approved by the U.S. Environmental Protection Agency (EPA) Jan. 31, 2001. It calls for the Odessa Southeast Lagoon System permit to be revised to include an ammonia limit. The permit will also require a method to mitigate the low dissolved oxygen content of the effluent. The exact method for achieving higher oxygen levels will be negotiated with the permit holder. A map of the area and tables of the existing data are found below. Because data collected after the TMDL was written indicated that a nonpoint source of nutrients were not addressed in the TMDL, the TMDL was revised to account for that.

Map of Davis Creek in Lafayette County, Missouri, with Sampling Sites



Index to Sampling sites

Site 1	Davis Creek 125 yards above OSLS outfall
Site 2	Odessa SE Lagoon outfall
Site 3	Davis Creek 0.25 miles below OSLS, Starr Rd County Bridge crossing
Site 4	Davis Creek 2.0 miles below OSLS outfall, Hwy M Bridge crossing
Site 5	Davis Creek at upstream side of Oakland School County Road Bridge crossing
Site 6	South Davis Creek at upstream side of Vernon Road Bridge crossing

Dissolved Oxygen and Ammonia Levels in Davis Creek: July 8, 1998 (mg/L)

Site	Early Morning		Early Afternoon	
	D.O.	NH_3-N	D.O.	NH_3-N
1	4	0.81	9.9	0.005
2	5.3		9	0.39
3	0.5	1.42	4.3	1.86
4	1.8	1.63	4.6	1.7
5	5.4	0.05	10.9	0.02
6	8.2	0.005	10.2	0.005

Dissolved Oxygen and Ammonia Levels in Davis Creek: July 9, 1998 (mg/L)

Site	Early Morning		Early Afternoon	
	D.O.	NH_3-N	D.O.	NH_3-N
1	4	0.07	7.7	0.005
2	5.2		4.8	0.8
3	0.2	1.9	3.1	2.15
4	1.5	1.92	4.4	2.02
5	5.4	0.04	11.8	0.03
6	9.3	0.005	11.1	0.01

Dissolved Oxygen and Ammonia Levels in Davis Creek: March 3, 2000 (mg/L)

Site	Early Morning		Early Afternoon	
	D.O.	NH_3-N	D.O.	NH_3-N
1	10.4	0.025	11.6	0.025
2	8.5	0.025	10.8	0.025
3	9.8	0.025	12.6	0.025
4	9.4	0.025	11.4	0.025
5	9.7	0.025	14.0	0.025
6	9.9	0.025	12.4	0.025

D.O = Dissolved Oxygen (required by organisms to survive) and NH_3-N = Ammonia as Nitrogen
Source: Missouri Department of Natural Resources

For more information call or write:

Missouri Department of Natural Resources,
Water Pollution Control Program
P.O. Box 176, Jefferson City, MO 65102-0176
1-800-361-4827 or (573) 751-1300 office
(573) 526-5797 fax
Program Home Page: www.dnr.state.mo.us/wpscd/wpcp/index.html